

**REMARKS**

Claims 1-7 are pending in the Application.

Claims 1-7 have been amended by changing “method” to “processor-implemented method” (Claim 1, line 1; Claim 2, line 2; Claim 3, line 1; Claim 4, line 1; Claim 5, line 1; Claim 6, line 1; Claim 7, line 1) and by requiring steps to be performed “employing a processor.” (Claim 1, lines 3, 5, 7, 9, and 1; Claim 2, lines 3, 5, 7, 8, and 10; Claim 3, lines 3, 5, and 7; Claim 4, lines 3, 5, 7, and 8; Claim 5, line 3, 5, and 7; Claim 6, line 2; Claim 7, lines 3, 5, 7, 8, and 10) Support for these amendments may be found in the Specification in the reference to a “processing loop” at page 6, line 20, as well as in the reference to a “preprocessing step” on page 7, line 10, which necessarily implies a subsequent processing step. The Specification also indicates that operations are to be computed not by a human being but by a computer: in the reference to “Input” and “Output” at page 7, lines 13, 15; by the description of an “initialization” step at page 6, line 17; and by the use of a “machine learning method” at page 9, line 13, as well as in Figure 2, step 202.

Additional amendments to Claims 1, 3, and 4 add the requirement of a “machine learning method,” which is discussed in the preceding paragraph. Claims 1 and 4 have been amended by adding the phrase “by a machine learning method” (Claim 1, line 9; Claim 4, line 7) to the step of obtaining or generating classification rules, as shown in the Specification at page 9, line 13, and in Figure 2, step 202. The step, “employing a processor to apply a machine learning method to find an ensemble of classification rules” has been added to Claim 3 (Claim 3, lines 5-6) on the basis of the Specification at page 9, line 13, and Figure 2, step 202.

No new matter has been added.

**The Claimed Invention**

Statistical prediction methods are used for purposes relating to product improvement in a number of industries. Prediction methods fall into two categories of

statistical problems: classification and regression. For classification, the predicted output is a discrete number, a class, and performance is typically measured in terms of error rates. For regression, the predicted output is a continuous variable and performance is typically measured in terms of distance, such as mean squared error or absolute distance.

A prediction problem that has a true or false outcome like a credit evaluation problem is a classification problem. To provide an example of a type of problem the claimed invention may be used to address, take the following credit evaluation:

No.	Name	Age	Sex	Salary	Credit Card Debt	Mortgage Debt	Result or Prediction
1	John Smith	40	M	50K	5K	200K	1
2	Carol Jones	50	F	75K	29K	400K	0
3	New Applicant	45	F	85K	10K	300K	?

In this example, the objective of prediction is whether the customer is more likely to pay (1) or default (0) on a new credit application. Examples of prior customers will be given to a computer program to learn how to predict the outcome of a loan to a new individual.

The claimed invention provides a processor-implemented pattern recognition method that induces ensembles of decision rules from data for regression problems. Instead of direct prediction of a continuous output variable, the method using a preprocessing step to discretize the variable and solves the resultant classification problem. Predictions on new examples are made by averaging the mean values of classes with votes that are close in number to the most likely class.

The type of problem addressed by the claimed invention involves a prediction of a real number, rather than a true or false condition. In the credit evaluation example, for example, the prediction column is modified to numbers that are the credit limit that may be extended to a credit applicant. John Smith receives a limit of 10K, while Carol Jones receives a limit of 4K:

No.	Name	Age	Sex	Salary	Credit Card Debt	Mortgage Debt	Result or Prediction
1	John Smith	40	M	50K	5K	200K	10K
2	Carol Jones	50	F	75K	29K	400K	4K
3	New Applicant	45	F	85K	10K	300K	?

A computer learns from the John Smith and Carol Jones data to predict the answer for a new applicant.

Thus, according to the claimed invention, a processor-implemented method is employed: to find  $k$  clusters for the  $y$  values by  $k$ -means method and number the clusters; to record the mean value of each cluster; and to assign the cluster number as the class label for each example that is a member of the cluster. (Figure 2, step 201) Once class labels have been assigned, a processor is employed to apply a machine learning method to find an ensemble of classification rules  $R$ . (Figure 2, step 202) Finally, further processing is employed to predict the value of a new example by: applying all rules in ensemble  $R$ ; counting the number of satisfied rules for each class; considering only the class with the most votes and those with nearly as many votes; and determining a prediction-weighted average (by votes) of the recorded mean values of the classes. (Figure 2, step 203)

#### Rejection of Claims 1-7

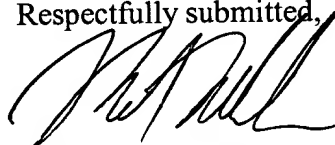
Claims 1-7 have been rejected by the Examiner under 35 U.S.C. § 101 as not directed to statutory subject matter and under 35 U.S.C. § 112, first paragraph, on the basis that any claims the fails to satisfy the subject-matter requirement of 35 U.S.C. § 101 also fails to satisfy the enablement requirements of 35 U.S.C. § 112. Applicant respectfully submits that Claims 1-7, as amended, satisfy the requirements of 35 U.S.C. §§ 101 and 112, first paragraph, and are therefore in condition for allowance.

Conclusion

In view of the foregoing, Applicant submits that Claims 1-7 are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed.

Applicant hereby makes a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Applicants' Deposit Account No. 50-0510 (IBM Corporation).

Respectfully submitted,



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